

at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, the control device operable to selectively program a plurality of phases of an injection procedure, each of the plurality of phases comprises at least one of a contrast medium phase, a flushing medium phase and a KVO phase. --

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--25. The apparatus of Claim ¹~~24~~ wherein at least one of the two fluid containers comprises a syringe.--

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--26. The apparatus of Claim ¹~~24~~ wherein the first phase comprises a flushing medium phase and the second phase comprises a contrast medium phase. --

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--27. The apparatus of Claim ¹~~24~~ wherein the phases are defined by at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.--

⁵
--28. A fluid injection apparatus comprising:

at least one drive mechanism;

at least one fluid container operably associated with the at least one drive mechanism; and

a control device operably associated with the at least one drive mechanism, the control device operable to selectively program at least two phases of an injection procedure, the first phase comprising one of at least a contrast medium phase and a flushing medium phase and the second phase comprising a hold phase, wherein KVO occurs during the hold phase. --

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-- ~~29~~. The apparatus of Claim ~~28~~ wherein the hold phase is of indefinite duration.--

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-- ~~30~~. The apparatus of Claim ~~28~~ wherein the hold phase allows an operator to modify one or more injection parameters of a subsequent phase.--

8
-- ~~31~~. The apparatus of Claim ~~28~~ wherein the at least one fluid container comprises a syringe.--

9
-- ~~32~~. A fluid injection apparatus comprising:

at least one drive mechanism;

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at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, said control device comprising:

means for programming a first phase of an injection procedure;

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure; and

means for programming a third phase of an injection procedure, subsequent to a second phase of an injection procedure, as a phase other than a flushing medium phase.--

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-- ~~33~~. The apparatus of Claim ~~32~~, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a phase other than a contrast medium phase.--

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--~~34~~. The apparatus of Claim ~~33~~⁹, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a contrast medium phase.--

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--~~35~~. The apparatus of Claim ~~32~~⁹, wherein said means for programming a second phase of an injection procedure comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a contrast medium phase; and

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a flushing medium phase.--

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--~~36~~. The apparatus of Claim ~~32~~⁹, wherein said control device further comprises means for programming a third phase of an injection procedure as a flushing medium phase.--

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--~~37~~. The apparatus of Claim ~~32~~⁹, wherein said means for programming a second phase of an injection procedure comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a hold phase. --

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--~~38~~. The apparatus of Claim ~~32~~⁹, wherein said control device further comprises means for programming a pause phase to occur between first and second phases of an injection procedure. --

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--~~39~~. A fluid injection apparatus comprising:

at least one drive mechanism;

at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, said control device comprising:

means for programming a first phase of an injection procedure;

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure;

means for programming a third phase of an injection procedure, subsequent to a second phase of an injection procedure; and

means for programming a fourth phase of an injection procedure, subsequent to a second phase of an injection procedure, as a phase other than a flushing medium phase.--

¹⁷
--~~40~~. The apparatus of Claim ¹⁶~~39~~, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a phase other than a contrast medium phase.--

¹⁸
--~~41~~. The apparatus of Claim ¹⁷~~40~~, wherein said means for programming a first phase of an injection procedure comprises means for programming a first phase of an injection procedure as a contrast medium phase.--

¹⁹
--~~42~~. The apparatus of Claim ¹⁶~~39~~, wherein said means for programming a second phase of an injection procedure comprises:

means for programming a second phase of an injection procedure,
subsequent to a first phase of an injection procedure, as a contrast medium phase;
and

means for programming a second phase of an injection procedure,
subsequent to a first phase of an injection procedure, as a flushing medium
phase.--

²⁰
--~~43~~¹⁶. The apparatus of Claim ~~39~~, wherein said means for programming a third
phase of an injection procedure comprises:

^{B1}
means for programming a third phase of an injection procedure,
subsequent to a second phase of an injection procedure, as a contrast medium
phase; and

means for programming a third phase of an injection procedure,
subsequent to a second phase of an injection procedure, as a flushing medium
phase.--

²¹
--~~44~~¹⁶. The apparatus of Claim ~~39~~, wherein said control device further comprises
means for programming a fourth phase of an injection procedure, subsequent to a third phase of
an injection procedure, as a flushing medium phase.--

²²
--~~45~~¹⁶. The apparatus of Claim ~~39~~, further comprising means for programming a
second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a
hold phase. --

²³
--~~46~~¹⁶. The apparatus of Claim ~~39~~, wherein said control device further comprises:

means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure; and

means for programming a pause phase to occur between first and second phases of an injection procedure. --

²⁴
~~24~~ -- ~~47~~. A fluid injection apparatus comprising:

at least one drive mechanism;

at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, said control device comprising means for programming a first phase of an injection procedure as a phase other than a contrast medium phase. --

²⁵ ²⁴
~~25~~ -- ~~48~~. The apparatus of Claim ~~47~~, wherein said control device further comprises means for programming a first phase of an injection procedure as a contrast medium phase.--

²⁶ ²⁴
~~26~~ -- ~~49~~. The apparatus of Claim ~~47~~ wherein at least one of the two fluid containers comprises a syringe.

²⁷ ²⁴
~~27~~ -- ~~50~~. The apparatus of Claim ~~47~~ wherein said means for programming a first phase of an injection procedure as a phase other than a contrast medium phase comprises means for programming a first phase of an injection procedure as a flushing medium phase.--

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--~~51~~. The apparatus of Claim ~~47~~, wherein said control device further comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a contrast medium phase.--

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--~~52~~. The apparatus of Claim ~~47~~, wherein said control device further comprises means for defining at least one phase of an injection procedure by at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.--

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--~~53~~. The apparatus of Claim ~~47~~, wherein said control device further comprises means for defining each phase of an injection procedure by at least two injection parameters selected from fluid flow rate, fluid volume and injection duration.--

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--~~54~~. The apparatus of Claim ~~47~~ wherein said control device further comprises:

means for programming a first phase of an injection procedure as a KVO phase. --

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--~~55~~. The apparatus of Claim ~~47~~ wherein said control device further comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a flushing medium phase.--

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--~~56~~. The apparatus of Claim ~~47~~ wherein said control device further comprises means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a KVO phase.--

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--~~57~~. The apparatus of Claim ~~47~~, further comprising means for programming a second phase of an injection procedure, subsequent to a first phase of an injection procedure, as a hold phase. --

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--58. The apparatus of Claim 57 wherein said means for programming a second phase of an injection procedure as a hold phase comprises means for establishing a hold phase of indefinite duration.--

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--59. The apparatus of Claim 58 wherein said means for programming a second phase of an injection procedure as a hold phase comprises means for establishing KVO during a hold phase.--

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--60. The apparatus of Claim 57, wherein said control device further comprises means for facilitating, during a hold phase, modification of one or more injection parameters of a subsequent phase.--

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--61. The apparatus of Claim 47, wherein said control device further comprises:

means for programming a second phase of an injection procedure,
subsequent to a first phase of an injection procedure; and

means for programming a pause phase to occur between first and second
phases of an injection procedure. --

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--62. The apparatus of Claim 61, wherein said means for programming a first phase of an injection procedure as a phase other than a contrast medium phase comprises means for programming a first phase of an injection procedure as a flushing medium phase.--

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--63. The apparatus of Claim 61, wherein said means for programming a second phase of an injection procedure comprises:

means for programming a second phase of an injection procedure,
subsequent to a first phase of an injection procedure, as a contrast medium phase;
and

means for programming a second phase of an injection procedure,
subsequent to a first phase of an injection procedure, as a flushing medium phase.

⁴¹
--~~64~~. The apparatus of Claim ³⁸~~61~~ wherein said means for programming a pause
phase comprises means for establishing a pause phase for a fixed duration of time.--

⁴²
--~~65~~. The apparatus of Claim ³⁸~~61~~ wherein said control device comprises means
for automatically commencing a second phase of an injection procedure after the end of a pause
phase.--

⁴³
--~~66~~. A fluid injection apparatus comprising:

at least one drive mechanism;

at least one fluid container operably associated with the at least one drive
mechanism; and

a control device operably associated with the at least one drive
mechanism, said control device comprising:

means for programming a first phase of an injection procedure as a
contrast medium phase;

means for programming a first phase of an injection procedure as a
flushing medium phase; and

means for programming a second phase of an injection procedure,
subsequent to a first phase of an injection procedure, as a hold phase.--

--~~67~~. A fluid injection apparatus comprising:

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at least one drive mechanism;

at least one fluid container operably associated with the at least one drive mechanism; and

a control device operably associated with the at least one drive mechanism, said control device comprising:

means for programming a first phase of an injection procedure as a contrast medium phase;

means for programming a first phase of an injection procedure as a flushing medium phase;

means for programming a second phase of an injection procedure as a contrast medium phase;

means for programming a second phase of an injection procedure as a flushing medium phase; and

means for programming a pause phase to occur between first and second phases of an injection procedure.--

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--~~68~~. A fluid injection apparatus comprising:

at least one drive mechanism;

at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, said control device comprising means for establishing a first phase of an injection procedure as a phase other than a contrast medium phase. --

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--69. A fluid injection apparatus comprising:

at least one drive mechanism;

B' at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, said control device comprising an arrangement for programming a first phase of an injection procedure as a phase other than a contrast medium phase. --

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--70. A fluid injection apparatus comprising:

at least one drive mechanism;

at least two fluid containers operably associated with the at least one drive mechanism, one fluid container containing a contrast medium and the other fluid container containing a flushing medium; and

a control device operably associated with the at least one drive mechanism, said control device comprising an arrangement for establishing a first phase of an injection procedure as a phase other than a contrast medium phase. --

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--71. A method of programming an injection apparatus comprising a drive mechanism, at least two fluid containers and a control device for programming the injection procedure, the method comprising:

selectively programming a plurality of phases of an injection procedure, each of the plurality of phases comprising at least one of a contrast medium phase, a flushing medium phase and a KVO phase. --

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--72. A method of programming an injection apparatus comprising a drive mechanism, at least two fluid containers and a control device for programming the injection procedure, the method comprising:

selectively programming at least two phases of an injection procedure, the first phase comprising one of at least a contrast medium phase and a flushing medium phase and the second phase comprising a hold phase, wherein KVO occurs during the hold phase. --

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--73. A method of programming an injection procedure, comprising:

providing an injection apparatus comprising a drive mechanism, at least two fluid containers and a control device for programming the injection procedure;

selectively programming a first phase of the injection procedure, the first phase comprising one of a contrast medium phase and a flushing medium phase;

selectively programming at least a subsequent second phase of the injection procedure, the second phase comprising one of a contrast medium phase and a flushing medium phase; and

selectively programming a KVO phase. --

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4. A method of programming an injection procedure comprising:

programming a first phase of an injection procedure;

programming a second phase of an injection procedure to occur subsequent to the first phase; and

programming a third phase of an injection procedure, to occur subsequent to the second phase, as a phase other than a flushing medium phase.--

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--75. The method of Claim 74, wherein said step of programming a first phase of an injection procedure comprises selectably programming the first phase of an injection procedure as a phase other than a contrast medium phase.--

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--76. The method of Claim 75, wherein said step of programming a first phase comprises selectably programming the first phase as a contrast medium phase.--

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--77. The method of Claim 74, wherein said step of programming a second phase comprises selectably programming the second phase as a contrast medium phase.--

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--78. The method of Claim 74, wherein said step of programming a second phase comprises selectably programming the second phase as a flushing medium phase.--

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--79. The method of Claim 74, wherein:

said step of programming a third phase is performed during one protocol;
and

said method further comprises, during another protocol, the step of
selectably programming a third phase of an injection procedure as a flushing medium
phase.--

⁵⁷
--80. The method of Claim ⁵¹~~74~~, wherein said step of programming a second phase
of an injection procedure comprises selectably programming the second phase as a hold phase. --

⁵⁸
--81. The method of Claim ⁵¹~~74~~, further comprising the step of programming a
pause phase to occur between first and second phases of an injection procedure.--

⁵⁹
--82. A method of programming an injection procedure comprising:

programming a first phase of an injection procedure;

programming a second phase of an injection procedure to occur
subsequent to the first phase;

programming a third phase of an injection procedure to occur subsequent
to the second phase; and

programming a fourth phase of an injection procedure, to occur
subsequent to the third phase, as a phase other than a flushing medium phase.--

⁶⁰
--83. The method of Claim ⁵⁹~~82~~, wherein said step of programming a first phase of
an injection procedure comprises selectably programming the first phase of an injection
procedure as a phase other than a contrast medium phase.--

⁶¹
~~--84.~~ The method of Claim ⁵⁹~~82~~, wherein said step of programming a first phase comprises selectably programming the first phase as a contrast medium phase.--

⁶²
~~--85.~~ The method of Claim ⁵⁹~~82~~, wherein said step of programming a second phase comprises selectably programming the second phase as a contrast medium phase.--

⁶³
~~--86.~~ The method of Claim ⁵⁹~~82~~, wherein said step of programming a second phase comprises selectably programming the second phase as a flushing medium phase.--

⁶⁴
~~--87.~~ The method of Claim ⁵⁹~~82~~, wherein said step of programming a third phase comprises selectably programming the third phase as a contrast medium phase.--

⁶⁵
~~--88.~~ The method of Claim ⁵⁹~~82~~, wherein said step of programming a third phase comprises selectably programming the third phase as a flushing medium phase.--

⁶⁶
~~--89.~~ The method of Claim ⁵⁹~~82~~, wherein:

^{B1}
said step of programming a fourth phase is performed during one protocol;
and

said method further comprises, during another protocol, the step of
selectably programming a fourth phase of an injection procedure as a flushing medium
phase.--

⁶⁷
~~--90.~~ The method of Claim ⁵⁹~~82~~, wherein said step of programming a second phase of an injection procedure comprises selectably programming the second phase as a hold phase. --

⁶⁸
~~--91.~~ The method of Claim ⁵⁹~~82~~, further comprising the step of programming a
pause phase to occur between first and second phases of an injection procedure.--

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--~~92~~. A method of programming an injection procedure comprising:
programming a first phase of an injection procedure as a phase other than a contrast medium
phase. --

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--~~93~~. The method of Claim ~~92~~, wherein:

said step of programming a first phase is performed during one protocol;
and

said method further comprises, during another protocol, the step of
selectably programming a first phase of an injection procedure as a contrast medium
phase.--

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--~~94~~. The method of Claim ~~92~~, further comprising the step of programming a
KVO phase.--

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--~~95~~. The method of Claim ~~92~~, further comprising the step of programming a
second phase of an injection procedure, to occur subsequent to a first phase of an injection
procedure, as a hold phase. --

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--~~96~~. The method of Claim ~~92~~, further comprising the step of modifying, during
said hold phase, one or more injection parameters of a subsequent phase.--

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--~~97~~. The method of Claim ~~92~~, further comprising:

programming a second phase of an injection procedure to occur
subsequent to the first phase of an injection procedure; and

programming a pause phase to occur between first and second phases of an
injection procedure.--

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-- 98. The method of Claim 97, wherein said step of programming a first phase comprises selectably programming the first phase as a flushing medium phase.--

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-- 99. The method of Claim 97, wherein said step of programming a second phase comprises selectably programming the second phase as a contrast medium phase.--

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-- 100. The method of Claim 97, wherein said step of programming a second phase comprises selectably programming the second phase as a flushing medium phase.--

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-- 101. The method of Claim 97 wherein said step of programming a pause phase comprises establishing said pause phase for a fixed duration of time.--

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-- 102. A method of programming an injection procedure, comprising:

selectably programming a first phase of an injection procedure, during a first protocol, as a contrast medium phase;

selectably programming a first phase of an injection procedure, during a second protocol, as a flushing medium phase; and

programming a second phase of an injection procedure, subsequent to the first phase during at least one of said first and second protocols, as a hold phase.--

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-- 103. A method of programming an injection procedure, comprising:

selectably programming a first phase of an injection procedure, during a first protocol, as a contrast medium phase;

selectably programming a first phase of an injection procedure, during a second protocol, as a flushing medium phase;

selectably programming a second phase of an injection procedure, during one of said first and second protocols, as a contrast medium phase;

selectably programming a second phase of an injection procedure, during one of said first and second protocols, as a flushing medium phase; and

programming a pause phase to occur between first and second phases of an injection procedure, during at least one of said first and second protocols.--